The Presidential Green Chemistry Challenge Awards Program

Nomination Package for 2007 Awards

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The Presidential Green Chemistry Challenge Awards Program: Nomination Package for 2007 Awards

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Introduction

THE PRESIDENTIAL GREEN CHEMISTRY CHALLENGE was established to recognize and promote innovative chemical technologies that prevent pollution and that have broad applicability in industry. The Challenge is sponsored by the Office of Pollution Prevention and Toxics of the United States Environmental Protection Agency in partnership with the American Chemical Society and other members of the chemical community.

This nomination package contains concise instructions on how to enter the competition. The program is open to all individuals, groups, and organizations in the United States, both nonprofit and for profit, including academia and industry. Entries must be sent no later than December 31. Awards will be presented the following summer in Washington, D.C.

Scope of the Program

The Presidential Green Chemistry Challenge recognizes chemical technologies that incorporate the principles of green chemistry into chemical design, manufacture, and use. For the purposes of the program, green chemistry is defined as "the use of chemistry for source reduction". Source reduction is the highest tier of the risk management hierarchy as described in the Pollution Prevention Act of 1990.[1]

Green chemistry reduces or eliminates the use or generation of hazardous substances from chemical products and processes. Green chemistry improves upon all types of chemical products and processes by reducing impacts on human health and the environment relative to the current state of the art.

In green chemistry, health and environmental effects are important throughout a technology's lifecycle. Green chemistry technologies, therefore, encompass all types of chemical processes including syntheses, catalyses, reaction conditions, separations, analyses, and monitoring. A green chemistry technology can involve implementing incremental improvements at any stage. It can, for example, substitute a greener feedstock, reagent, catalyst, or solvent in an existing synthetic pathway. A green chemistry technology also can involve substituting an improved product or an entire synthetic pathway. Ideally, a green chemistry technology incorporates the principles of green chemistry at the earliest design stages of a new product or process.

Additional Requirements

The nominated green chemistry technology must have reached a significant milestone within the past five years (e.g., been researched, demonstrated, implemented, applied, patented, etc.). It must also have a significant component within the United States.

EPA's Office of Pollution Prevention and Toxics is particularly interested in technologies that reduce or eliminate the following: lead; mercury; perfluorinated alkyl surfactants; polychlorinated or polybrominated biphenyls; or other persistent, bioaccumulative, and toxic substances.

Focus Areas

Nominated green chemistry technologies should be an example of one or more of the following three focus areas:

1. The use of greener synthetic pathways

   This focus area involves implementing a novel, green pathway for a new chemical product. It can also involve using a novel, green pathway to redesign the synthesis of an existing chemical product. Examples include synthetic pathways that:
   - Use greener feedstocks that are innocuous or renewable (e.g., biomass, natural oils).
   - Use novel reagents or catalysts, including biocatalysts and microorganisms.
   - Are natural processes, such as fermentation or biomimetic synthesis.
   - Are atom-economical.
   - Are convergent syntheses.

2. The use of greener reaction conditions

   This focus area involves improving conditions other than the overall design or redesign of a synthesis. Examples include reaction conditions that:
   - Replace hazardous solvents with solvents that have a reduced impact on human health and the environment.
   - Use solventless reaction conditions and solid-state reactions.
   - Use novel processing methods.
   - Eliminate energy- or material-intensive separation and purification steps.
   - Improve energy efficiency, including reactions running closer to ambient conditions.

3. The design of greener chemicals

   This focus area involves designing chemical products that are less hazardous than the products or technologies they replace. Examples include chemical products that are:
   - Less toxic than current products.
   - Inherently safer with regard to accident potential.
   - Recyclable or biodegradable after use.
   - Safer for the atmosphere (e.g., do not deplete ozone or form smog).

Many green chemistry technologies fit into more than one focus area. Choose a primary focus area that best fits your technology and list any other appropriate focus areas. Technologies that do not fit within at least one focus area may not be within the scope of the program.

Award Categories

Typically, the U.S. EPA presents one award in each of the following categories:
- Small Business: A small business[2] for a green chemistry technology in any of the three focus areas.
- Academic: An academic investigator for a technology in any of the three focus areas.

- Focus Area 1: An industry sponsor for a technology in focus area 1 (the use of greener synthetic pathways).
- Focus Area 2: An industry sponsor for a technology in focus area 2 (the use of greener reaction conditions).
- Focus Area 3: An industry sponsor for a technology in focus area 3 (the design of greener chemicals).

Selection Criteria

Nominated chemistry technologies must fall within the scope of the program. Technologies that meet the scope will then be judged on how well they meet the following criteria:

1. Science and innovation

   The nominated chemistry technology should be innovative and of scientific merit. The technology should be, for example:
   - Original (i.e., never employed before).
   - Scientifically valid. That is, can the nominated technology or strategy stand up to scientific scrutiny through peer review? Does the nomination contain enough chemical detail to prove its scientific validity? Has the mechanism of action been thoroughly elucidated through sound scientific research?

2. Human health and environmental benefits

   The nominated chemistry technology should offer human health and/or environmental benefits. The technology might, for example:
   - Reduce toxicity (acute or chronic) or the potential for illness or injury to humans, animals, or plants.
   - Reduce flammability or explosion potential.
   - Reduce the use or generation of hazardous substances, the transport of hazardous substances, or releases to air, water, or land.
   - Improve the use of natural resources, for example, by substituting a renewable feedstock for a petrochemical feedstock.

3. Applicability

   The nominated chemistry technology should have a significant impact. The technology may be broadly applicable to many chemical processes or industries; alternatively, it may have great impact on a narrow range of chemistry. The nominated technology should offer at least the following:
   - A practical, cost-effective approach to green chemistry.
   - A remedy to a real environmental or human health problem.
   - One or more technical innovations that can be transferred readily to other processes, facilities, or industry sectors.

IMPORTANT: To make the strongest presentation of your technology for the judges, you should include as much detail (nonproprietary) as possible in your nomination. The judges will pay close attention to the specifics of your chemistry, including detailed reaction pathways, comparisons to existing technology, toxicity data, quantities of hazardous substances reduced or eliminated, degree of implementation in commerce, and other technical, human health, environmental, and economic benefits.

How to Enter

Self-nominations are allowed and expected. There is no entry fee and no standard entry form, but nominations must meet certain requirements. Nominations must be single-spaced and no longer than eight pages, with type no smaller than 12-point. When printed on 8½-by-11-inch paper, they must have margins of at least 1 inch. Nominations that do not meet these requirements may be rejected by EPA. Nominations may include chemical reactions, tables, graphs, photographs, and other illustrations. Although nominations may be in color, the judges may read the nominations printed in black and white. Nominations should not, therefore, require color for interpretation.

A nomination must include the following:

1. A cover page with the project title followed by the date of the nomination and the complete names (with titles as appropriate), addresses, telephone numbers, and email addresses of the following individuals or organizations:

   Primary sponsor(s): the individual or organizational owner of the technology. For academic nominations, the primary sponsor is usually the principal investigator.

   Contact person(s): the individual who is responsible for communicating with the awards program sponsors. For academic nominations, the contact person is usually the principal investigator. For other nominations, the contact should be a project manager or other technical representative.

   Contributors: those individuals or organizations that have provided financial or technical support for development or implementation of the nominated technology. Providing information on contributor(s) is optional.

EPA will add the people listed as sponsors and contacts to a contact database. EPA periodically sends reminders and updates about the program to those in this database.

2. The second page should contain the following information:
   - Project title.
   - Short description of the most recent milestone(s), with date(s), that the nominated technology has reached within the past five years. Examples include, but are not limited to: critical discovery made, results published, patent application submitted or approved, pilot plant constructed, and technology implemented or commercialized. Only one milestone is required.
   - Statement indicating whether the nominated technology is eligible for the small business award, the academic award, or both.
   - Statement indicating which one of the three focus areas best describes the nominated technology (i.e., the primary focus area). If the nominated technology falls within more than one focus area, you may include the secondary focus area(s).
   - If the nominated technology involves international or multinational collaboration: Description of the aspects of the technology that occurred within the U.S. during the past five years.

- An abstract not to exceed 300 words that describes the nominated technology. Consider including information about the problem your technology addresses and the benefits of your technology. EPA plans to publish these abstracts in its annual Summary of Award Entries and Recipients booklet.

3. The third page should consist of a one-page executive summary of the nominated technology. Please repeat the project title on this page. For the winning technologies, EPA plans to publish this summary in its Award Recipients booklet, on its website, and in its Summary of Award Entries and Recipients booklet.

4. The remaining pages should explain in detail how the nominated technology meets the scope of the program and the selection criteria (see pages 1-2). Explain the following:
   - The chemistry of the new technology, emphasizing how the technology is innovative and of scientific merit. Consider including chemical structure diagrams rather than using simple text to describe your chemistry. Patent numbers or references to peer-reviewed publications may also strengthen your nomination. The judges recognize the interdisciplinary nature of green chemistry. To be eligible for an award, however, your technology must include a significant chemistry component, even though it is probably the result of collaborations with engineers, biologists, toxicologists, etc.
   - The problem (environmental or human health risk) that your technology addresses and how your technology solves the problem.

In addition, EPA strongly encourages you to compare the cost, performance, and environmental profile of your technology with any competing technologies. This may help you demonstrate the broad applicability of your technology.

You may include structure diagrams, tables, and other graphics. You may use color in your nomination, but be aware that the nomination may be printed in black and white, so information in color may be illegible.

There is no limit on the number of nominations that EPA will accept from any one sponsor. A sponsor must, however, submit each nomination separately.

All entries received will be considered public information. No material will be returned. Program sponsors are not responsible for lost or damaged entries. EPA acknowledges receipt of nominations, usually by email. If you have not received an acknowledgment by mid-January, please contact the Green Chemistry Program at greenchemistry@epa.gov or (202) 564-8740.

Submit an electronic copy of the nomination with the primary sponsor's name in the file name. It may be to your advantage to submit your nomination as a .pdf file to minimize possible reading errors, but EPA accepts and is able to read all common file types. The electronic copy may be emailed to greenchemistry@epa.gov (preferred) or sent on a floppy disk, Zip™ disk, or CD, clearly labeled with the sponsor, computer format (Windows or Macintosh), and file name(s). The nomination must be sent no later than December 31.

Note: Irradiation of Federal mail may damage electronic media. To send a disk, please use a package delivery service and the following address:

Presidential Green Chemistry Challenge
Attn: Richard Engler
U.S. Environmental Protection Agency
EPA East, Room 5133
1201 Constitution Ave., NW
Washington, DC 20004
Telephone: 202-564-8740

Judging Entries

A panel of technical experts selected by the American Chemical Society will judge the nominations. These experts might include members of the scientific, industrial, governmental, educational, and environmental communities. The judges may request verification of any chemistry described or claims made in nominations that are selected as finalists. The judges will select award recipients based on the green chemistry technologies that best meet the selection criteria.

Notification of Winners

Winners will be notified prior to the official public announcement, which will be made in summer 2007, in Washington, DC. A crystal sculpture will be presented to the primary sponsor(s) of the winning green chemistry technology in each of the five award categories. Certificates will be presented to individuals (as identified by the primary sponsor) who contributed to the research, development, or implementation of the chemistry.

Additional Information

Questions about eligibility, nomination procedures, or the Presidential Green Chemistry Challenge program should be directed to EPA's Industrial Chemistry Branch at greenchemistry@epa.gov or (202) 564-8740.

Footnotes

[1]Pertinent sections of the Pollution Prevention Act of 1990: Sec. 6601. SHORT TITLE. This subtitle may be cited as the "Pollution Prevention Act of 1990." Sec. 6602. FINDINGS AND POLICY.

(b) Policy. - "The Congress hereby declares it to be the national policy of the United States that pollution should be prevented or reduced at the source whenever feasible."

Sec. 6603. DEFINITIONS. For the purposes of this subtitle -"(5)(A) The term "source reduction" means any practice which:

(i) reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal, and

(ii) reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants."

[2]A small business is defined here as one with annual sales of less than $40 million, including all domestic and foreign sales by the company, its subsidiaries, and its parent company.

Sample Cover Page

Please use the format below for the cover page of your nomination

Title of Nomination
Date of Nomination

Academic Sponsors:	**Business Sponsors:**
Primary Sponsor(s):	Primary Sponsor(s):
Full Name (Primary Investigator)	Company Name
Title	Full Name (optional)
Address	Title (optional)
Phone	Address
Email	Phone
	Email
Contact Person(s):	
Full name	Contact Person(s):
Title	Full name
Address	Title
Phone	Address
Email	Phone
	Email
Contributor(s): (optional)	
Individuals and/or organizations	Contributor(s): (optional)
	Individuals and/or organizations

Award Nomination Checklist

Your nomination should include the following components: (see "How to Enter," page 4, for details)

- ☐ Cover page
- ☐ Short description of the most recent milestone(s) and date(s).
- ☐ Statement indicating whether the nomination is eligible for an award in the academic category, the small business category, or both.
- ☐ Statement identifying the primary focus area for the nominated technology and any secondary focus area(s).
- ☐ For international or multinational collaborations: Statement of the activities that took place within the United States during the past five years.
- ☐ Abstract (300 words or fewer).
- ☐ Executive summary (limit: one page).
- ☐ Description of nominated technology (5 pages or fewer).

Note: EPA requires only an electronic copy of each nomination; it no longer requires a hard copy.

United States
Environmental Protection Agency
(7406M)
Washington, DC 20460

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